FINAL-TERM EXAM ODD SEMESTER ACADEMIC YEAR 2021/2022
STUDY PROGRAM COMPUTER ENGINEERING
FACULTY OF ENGINEERING AND INFORMATICS
UNIVERSITAS MULTIMEDIA NUSANTARA

Subject	:	**CE232 Digital Systems**	**Date**	:	
Lecturer(s)	:	**Tatang G, Megantara P, Kemalhasa**	**Time**	:	
Form	:	**Essay**	**Type**	:	**Onsite**

EXAM CONDITIONS / INSTRUCTIONS:

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COURSE SUB LEARNING OUTCOMES (SUB-CLO):

SUB LEARNING OUTCOMES (SUB-CLO)		ELO
Code	**Description**	
Sub-CPMK 7	Student will have a firm of understanding combinational circuits such as decoder, multiplexer	J
SUB-CPMK 8	Student will have a firm understanding the Flip Flop	J
SUB-CPMK 9	Student will have a firm analyzing sequential circuits counter	J
SUB_CPMK 11	Student will have a firm understanding design counter	J
Sub-CPMK 10	Student will be able to simplify sequential circuits	J

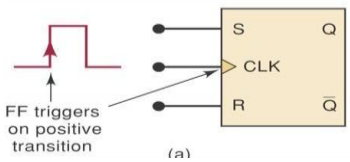
PROBLEM/QUESTIONS:

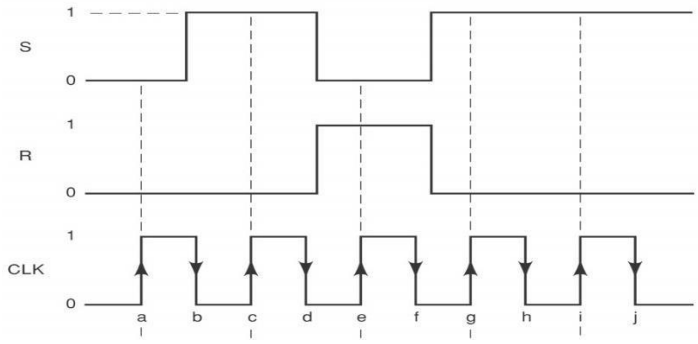
Question 1: Sub-CPMK 8 Flip Flop, Weight (18%)

Suppose the waveforms are applied to the input of the Flip Flop as in the figure, determine the Q waveform for each Flip Flop with initially Q are 0

(Score 6)

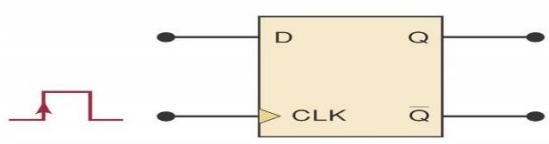
a. S –R Flip Flop

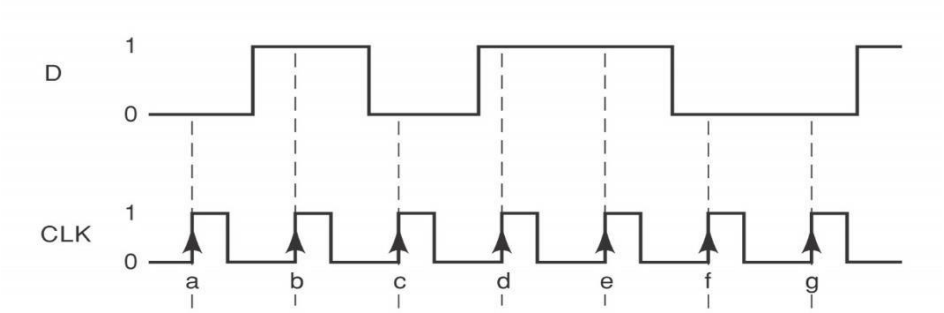




Q

b. D Flip Flop **(Score 6)**

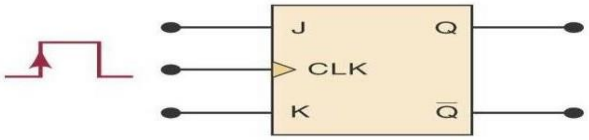


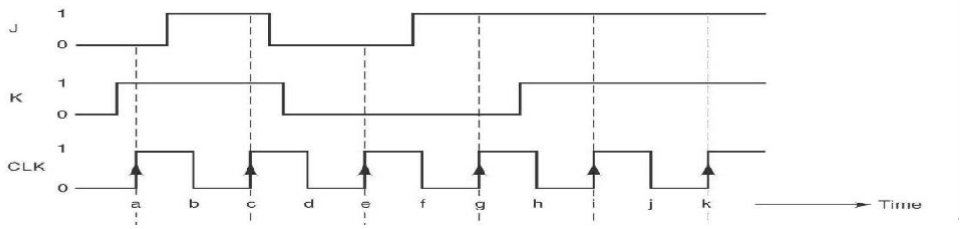


Q.

c. **J**-K Flip-Flop

(Score 6)





Q.

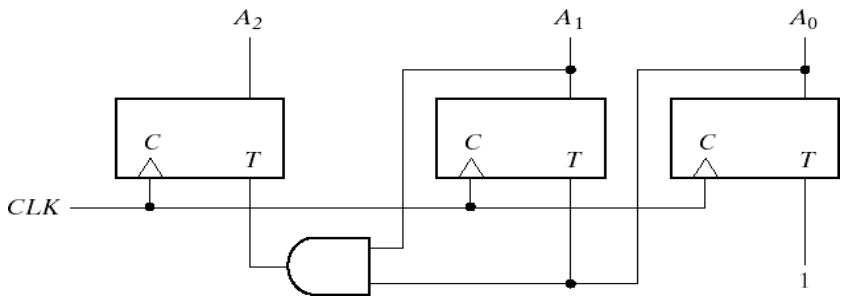
ASSESSMENT RUBRIC:

Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
Every correct answer is worth 1.5 ponts, wrong 0 points	0 points				12 points

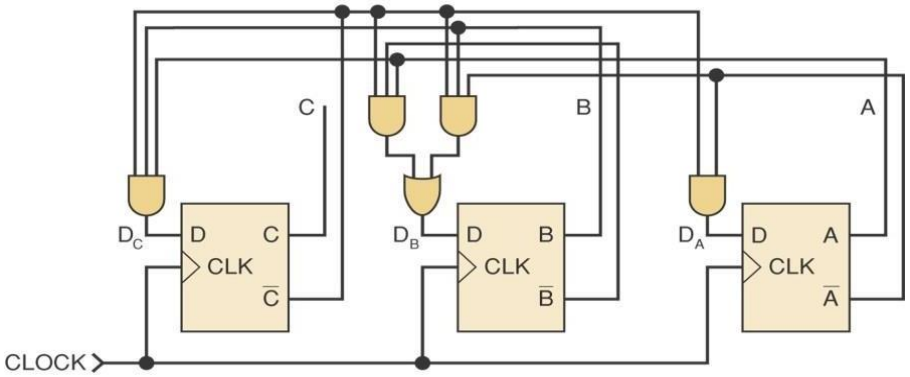
Question 2: Sub-CPMK 9 analyzing sequential circuits counter **, Weight (18%)**

Analyze the synchronous counter in the figure as what mod

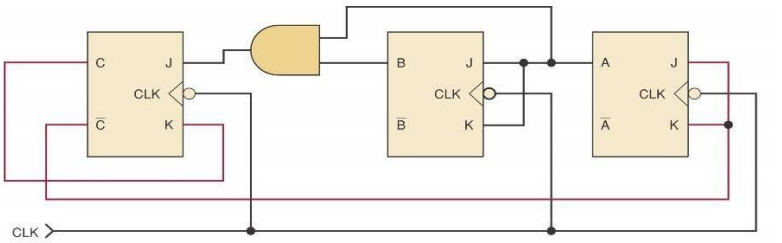
a. T Flip Flop **(score 6)**



b. D Flip Flop **(Score 6)**



c. J K Flip Flop **(Score 6)**



ASSESSMENT RUBRIC :

Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
	< 45	45-54	55-69	70-84	(Score ≥ 85)
Each correct answer is worth 4 point Minimum expression	< 50% corect		>60% Corect		.> 85%correct, minimum expression

Question 3: Sub-CPMK 11 Designing counter circuits**, Weight (18%)**

Design a counter circuit 6 **(mod 6**) using the J-K flip-flop. Do it with determine Present state, Next state, J-K control and Simplify with K map, then create a series of counters .
(Score 18)

ASSESSMENT RUBRIC :

Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
	< 45	45-54	55-69	70-84	(Score ≥ 85)
Correct expression or correct circuit is worth 4 point					

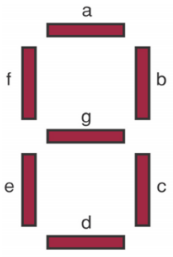
Question 4: Sub-CPMK 7 Design Combinational circuit Decoder / Multiplexer
Weight (16%)

a. Design a logic selector circuit (multiplexer) to set 8 pieces of data I0, I1 , I2 , I3, I4, I5, I6, I7 using **Decoder** 3 to 8 , **AND** **,OR** component ,so that they can be taken data one by one **.** **(Score 8)**

b. Create a table that converts **BCD to seven segment**

D C B A	**a**	**b**	**c**	**d**	**e**	**f**	**g**
0 0 0 0							
…							
1 0 0 1							

(Score 8)



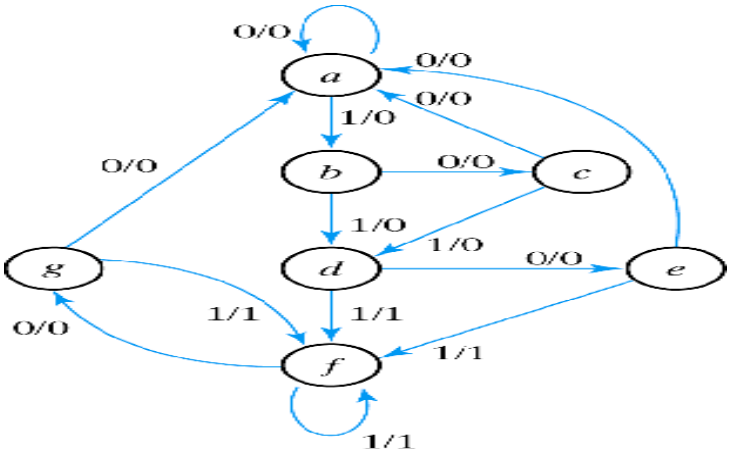
ASSESSMENT RUBRIC :

Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
	< 45	45-54	55-69	70-84	(Score ≥ 85)
Correct maped, and correct the functions			Only Correct maped		Mapped and function are corect

Question 5: Sub-CPMK 10 Simplify sequential circuit by Stete diagram**, Weight (12%)**

Simplify the following state diagram, by :

a. Create the state table**.** **(Score 4)**
b. Simplify with an implication table**.** **(Score 4)**
c. Create a new state diagram**.** **(Score 4)**



ASSESSMENT RUBRIC (per question):

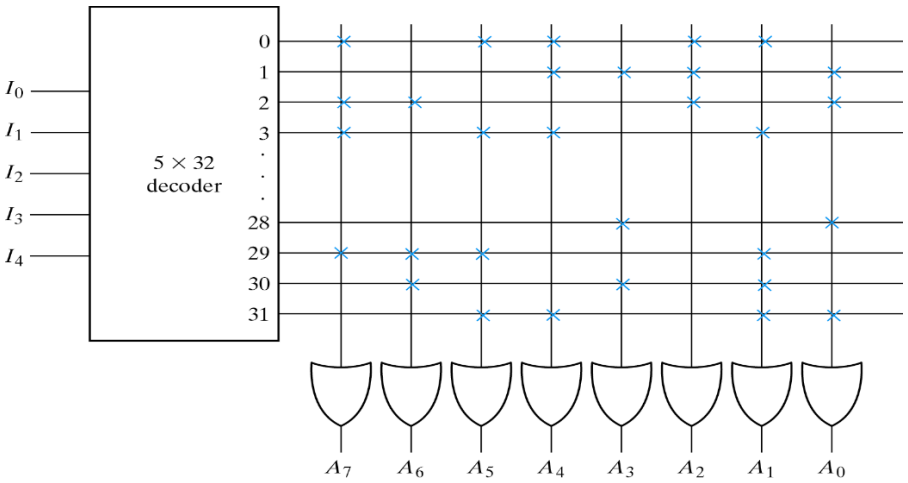
Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
	< 45	45-54	55-69	70-84	(Score ≥ 85)
Method, table, and the result	Wrong method		Correct method,step by step table		Method table and function corect

Question 6: Sub-CPMK 7 **Design** Combinational circuit, **Weight (16%)**

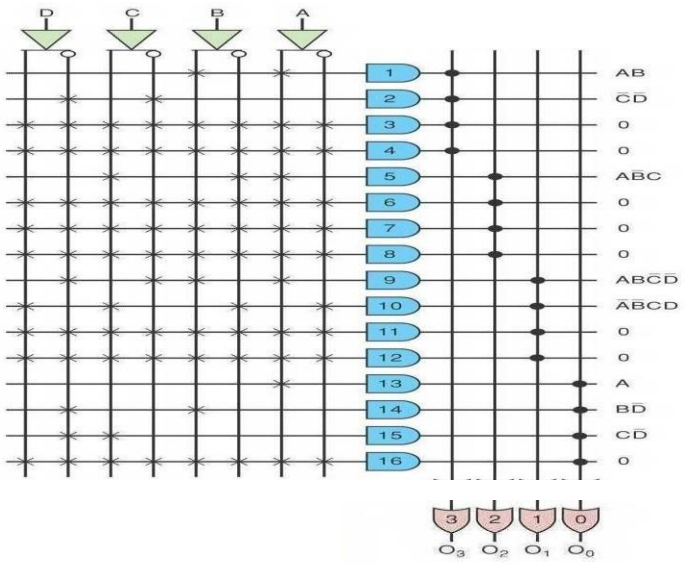
From the output decoder determine :

a. function of **A2 (I0, I1, I2 I3, I4) = (0, 16, 28)** **(Score 5**)

b. By combining crosing several outputs decoder design the function of **A5 = AB'C**
(Score 5)

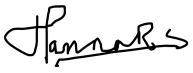


c. Determine the functions of Q_0, Q_2, of the following PLA **(Score 6)**



ASSESSMENT RUBRIC (per question):

Rated aspect	Assessment criteria				
	Very Poor	Poor	Satisfactory	Good	Excellent
	< 45	45-54	55-69	70-84	(Score ≥ 85)
Format and,method	Wrong method		Format or method is corect		Format and method corect

References:	Created by:	Approved by:
PPT 8 to 13	on behalf of the Lecturer Team  (Tatang gunar Setiadji, M.Eng.) Course Coordinator	 (Samuel, M.T.I.) Head of Study Program